

CLAIMS

1. An electric power steering device comprising: a small gear having a gear body which is rotated by an electric motor and on which a tooth portion is formed and shaft portions respectively formed so as to protrude from both end portions of said gear body and being smaller in diameter than said gear body; bearings for respectively bearing both said shaft portions of said small gear so that said small gear can move in an axial direction; two circular elastic bodies, respectively externally fitted on both said shaft portions of said small gear, for suppressing movement of said small gear in the axial direction to shaft end portions; and a large gear meshing with the tooth portion of said gear body of said small gear and connected to a steering means; and being configured to assist steering by rotation of said electric motor, characterized by comprising:

limiting members, provided at portions along outer circumferences of said shaft portions respectively at its both end portions of said gear body, for limiting deflection amounts of said elastic bodies.

2. The electric power steering device as set forth in claim 1, characterized in that said circular elastic body has flat portions formed on inner circumferential side, and a tapered portion formed on outer circumferential side and connected to said flat portions.

3. The electric power steering device as set forth in claim 2, characterized in that

 said bearings are roller bearings,

 said circular elastic body is a belleville spring having said flat portions at its end portions and multiple flexible pieces formed so as to protrude from said tapered portion to the inner circumferential side,

 said limiting members are disposed between inner rings of said roller bearings and its both end portions of said gear body of said small gear, respectively, and

 said inner rings of said roller bearings are configured so as to make contact with protruding side faces of said flat portions, and said limiting members are configured so as to make contact with rear faces of said protruding side faces.

4. The electric power steering device as set forth in claim 1, characterized in that

 said bearings are configured so as to be movable in a direction wherein a distance between a rotational center of said small gear and a rotational center of said large gear becomes long or short, and

 an energizing means for energizing said bearings in a direction wherein the distance between the rotational center of said small gear and the rotational center of said large gear becomes

short is provided.

5. The electric power steering device as set forth in claim 4, characterized in that

 said bearings are roller bearings, and

 said circular elastic bodies are belleville springs disposed between inner rings of said roller bearings and end portions of said gear body of said small gear.

6. The electric power steering device as set forth in claim 1, characterized in that

 said bearings are roller bearings, and

 said circular elastic bodies are installed in inner rings of said roller bearing.

7. The electric power steering device as set forth in claim 6, characterized in that

 circular grooves are formed on outer circumferential faces of said inner rings of said roller bearings between raceway grooves and side faces on sides of said gear body of said small gear, and

 said circular elastic bodies are belleville springs whose inner circumferential portions are formed so as to be fitted in said circular grooves formed on the outer circumferential faces of said inner rings of said roller bearings.

8. The electric power steering device as set forth in claim 1, characterized in that said circular elastic bodies are belleville springs whose outer circumferential portions are formed so as to be fitted in circular grooves formed on inner circumferential faces of cylindrical concave portions formed at end portions of said small gear.

9. The electric power steering device as set forth in claim 1, characterized in that

 said circular elastic bodies are cylindrical elastic bodies externally fitted over portions of said shaft portions of said small gear between inner rings of said roller bearings and end portions of said gear body of said small gear, and

 said limiting members are provided at portions of end portions of said small gear inside said cylindrical elastic bodies.

10. The electric power steering device as set forth in claim 9, characterized in that

 said cylindrical elastic bodies are coil springs, and

 said limiting members are convex members provided so as to be integrated with the end portions of said small gear.